

REMARKS

35 USC §102

Claims 1-15 are rejected under 35 USC §102(b) as being anticipated by Gallagher et al. (US 6596467). The Applicants respectfully disagree.

Claim 1 of the present application recites:

1. A multilayered dielectric structure which comprises:
 - a) a porous dielectric layer which has a porosity of about 10% or more;
 - b) an adhesion promoting dielectric layer on the porous dielectric layer which has a porosity of about 10% or less; and
 - c) a substantially nonporous capping layer on the adhesion promoting dielectric layer.

The Applicants believe that the Examiner has missed a key point of the Gallagher reference. The Examiner points to Column 11, lines 49-51 to show that Gallagher anticipates utilizing a relatively non-porous dielectric layer (B-stage dielectric matrix) on top of a porous dielectric layer. The Examiner has clearly glossed over the fact that in the previous paragraph in Column 11, specifically lines 6-36, Gallagher teaches that a metal layer, seed layer or barrier layer must be applied on top of the porous dielectric layer, before any additional layers are applied. Its the essence of the Gallagher invention. Once the metal layer, seed layer or barrier layer is applied, both the porous layer and other layer are treated to remove some of the porogen from the porous dielectric layer. It is only after that point when an additional layer is applied, such as another dielectric layer. These metal layers, barrier layers and seed layers are specifically – by definition – designed to keep an additional layer from migrating into the layer below the metal layer, barrier layer or seed layer. In addition, the Gallagher reference specifically teaches against adding a cap layer throughout the

reference and specifically in Column 11, lines 37 and 38, when Gallagher states: “Further, the elimination of an added cap layer provides a porous dielectric material layer having a rough surface.”

In claim 1 of the present application, a porous dielectric layer is adhered to a cap layer via an intermediate adhesion promoting dielectric layer. It is clear from the specification that the adhesion promoting layer is applied directly to the underlying porous dielectric layer, especially given the statement on page 25, lines 17-20: “Preferably the coating of the adhesion promoting dielectric layer onto the porous dielectric layer results in an infiltration of the adhesion promoting layer into the porous dielectric layer of about 300 angstroms or less.” This infiltration of the adhesion promoting layer into the porous dielectric layer would be virtually impossible if there was a metal layer, barrier layer or seed layer between the two by virtue of the very nature of these types of barrier layers. Therefore, the Gallagher reference cannot possibly anticipate claim 1 of the present application.

In addition, claim 1 recites a substantially nonporous cap layer applied to the adhesion promoting layer. The Gallagher reference specifically teaches against using a cap layer, because the Gallagher invention is designed to eliminate the need of a cap layer. Therefore, the Gallagher reference cannot possibly anticipate claim 1 of the present application.

In addition, Gallagher does not teach all of the claimed elements of the present application. “Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration.” *W. L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983) (citing *Soundsciber Corp. v. United States*, 360 F.2d 954, 148 USPQ 298, 301 (Ct. Cl.), *adopted*, 149 USPQ 640 (Ct. Cl. 1966)) Further, the prior art reference must disclose each element of the claimed invention “**arranged as in the claim**”. *Lindermann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984)(citing *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983)). Gallagher does not teach a layered material having an adhesion promoting layer applied to and infiltrating a porous dielectric layer. Second, Gallagher does not teach applying a substantially non-porous capping layer to the adhesion promoting layer. Based on this argument, along with others such as that discussed above, Gallagher does not anticipate claim 1 of the present application because Gallagher is lacking

and/or missing at least one specific feature or structural recitation found in the present application, and in claim 1. Claim 1 is therefore allowable as not being anticipated by Gallagher. Further, Gallagher does not anticipate claims 2-15 of the present application by virtue of their dependency on claim 1.

35 USC §103

Claims 16-23 are rejected under 35 USC §103(a) as being unpatentable over Gallagher et al. (US 6596467) in view of Leung et al. (US Publication 2005/0106376). The Applicants respectfully disagree.

Claim 16 of the present application recites:

16. A method for forming a multilayered dielectric structure comprising:
- a) coating a substrate with a first composition comprising a pre-polymer, solvent, optional catalyst, and a porogen to form a film, cross-linking the composition to produce a gelled film, and heating the gelled film at a temperature and for a duration effective to remove substantially all of said porogen to produce a porous dielectric layer which has a porosity of about 10% or more;
 - b) coating the porous dielectric layer with a second composition comprising a silicon containing pre-polymer, solvent, and optional catalyst; followed by cross-linking and heating to produce an adhesion promoting dielectric layer on the porous dielectric layer which has a porosity of about 10% or less; and
 - c) forming a substantially nonporous capping layer on the adhesion promoting dielectric layer.

The Applicants believe that the Examiner has missed a key point of the Gallagher reference. The Examiner points to Column 11, lines 49-51 to show that Gallagher anticipates utilizing a relatively non-porous dielectric layer (B-stage dielectric matrix) on top of a porous dielectric layer. The Examiner has clearly glossed over the fact that in the previous paragraph in Column 11,

specifically lines 6-36, Gallagher teaches that a metal layer, seed layer or barrier layer must be applied on top of the porous dielectric layer, before any additional layers are applied. Its the essence of the Gallagher invention. Once the metal layer, seed layer or barrier layer is applied, both the porous layer and other layer are treated to remove some of the porogen from the porous dielectric layer. It is only after that point when an additional layer is applied, such as another dielectric layer. These metal layers, barrier layers and seed layers are specifically – by definition – designed to keep an additional layer from migrating into the layer below the metal layer, barrier layer or seed layer. In addition, the Gallagher reference specifically teaches against adding a cap layer throughout the reference and specifically in Column 11, lines 37 and 38, when Gallagher states: “Further, the elimination of an added cap layer provides a porous dielectric material layer having a rough surface.”

In claim 16 of the present application, a method is recited wherein a porous dielectric layer is adhered to a cap layer via an intermediate adhesion promoting dielectric layer. It is clear from the specification that the adhesion promoting layer is applied directly to the underlying porous dielectric layer, especially given the statement on page 25, lines 17-20: “Preferably the coating of the adhesion promoting dielectric layer onto the porous dielectric layer results in an infiltration of the adhesion promoting layer into the porous dielectric layer of about 300 angstroms or less.” This infiltration of the adhesion promoting layer into the porous dielectric layer would be virtually impossible if there was a metal layer, barrier layer or seed layer between the two by virtue of the very nature of these types of barrier layers. One of ordinary skill in the art of semiconductor chemistry would not read the Gallagher reference and understand it to mean that the metal layer, barrier layer or seed layer can be removed in order to apply an adhesion promoting layer to a porous dielectric layer.

In addition, claim 16 recites a substantially nonporous cap layer applied to the adhesion promoting layer. The Gallagher reference specifically teaches against using a cap layer, because the Gallagher invention is designed to eliminate the need of a cap layer. One of ordinary skill in the art would not read the Gallagher reference, after specifically stating that one of the goals of the invention is to eliminate the need for a capping layer, and understand it to mean that a substantially non-porous capping layer can be applied to the layered material.

The question then becomes whether the Leung reference cures the deficiencies of the Gallagher reference, so as to teach, suggest or motivate one of ordinary skill in the art to produce the subject matter of claim 16. The Examiner is using the Leung reference to show how Leung is improving nanoporous silica dielectric films. Leung is not being utilized, however, to add to the Gallagher reference in order to render obvious claim 16 of the present application, because Leung doesn't supplement Gallagher's teaching that a metal layer, seed layer or barrier layer must be applied on top of the porous dielectric layer, before any additional layers are applied. Leung also isn't being used to supplement Gallagher's teaching against adding a cap layer to the layered material. Therefore, the combination of the Gallagher reference and the Leung reference contributes nothing to the Examiner's point that these two references combined renders unpatentable claim 16 of the present application. In addition, claims 17-23 are also allowable by virtue of their dependency on independent claim 16.

REQUEST FOR ALLOWANCE

Claims 1-23 are pending in this application, and the Applicant respectfully requests that the Examiner reconsider all of the claims in light of the arguments presented and allow all current and pending claims.

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Respectfully submitted,

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